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AUTHOR	Jacks, Lloyd P.
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ABSTRACT

To determine how the Subject Matter Service (SMS) of the Agricultural Education Department at Mississippi State University could more effectively meet the needs of vocational agriculture teachers, this study focused on three problems: (1) evaluation of materials developed by the SMS, (2) determination of sources and uses of teaching materials, and (3) determination of teacher preferences for new subject matter materials. Utilizing the description method with the group-interview technique, the study obtained data from 266 experienced teachers. Several recommendations are presented which focus on visual aids, revision of materials, format changes, and teacher guides related to the subject matter references. Results of the study show that current activities are not meeting teacher needs. Consequently the SMS must be geared to keep abreast of the growing needs of teachers by expanding facilities and personnel. (GB)

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DEVELOPMENT AND USE OF SUBJECT MATTER MATERIALS FOR VOCATIONAL EDUCATION IN AGRICULTURE

by

Lloyd P. Jacks

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The Division of Vocational and Technical Education
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TABLE OF CONTENTS

	Page
PREFACE	
INTRODUCTION	1
The Overall Problem	1
Need for the Study.	2
PROCEDURES	5
Problem Design	5
Collection and Treatment of Data	5
SUMMARY OF FINDINGS	6
Problem I: Evaluation of Subject Matter Materials	6
Problem II: Determination of Sources and Usage	7
Problem III: Teacher Preferences for New Materials.	8
CONCLUSIONS.	11
Problem I: Evaluation of Subject Matter Materials	11
Problem II: Determination of Sources and Usage	12
Problem III: Teacher Preferences for New Materials.	13
RECOMMENDATIONS	15
APPENDICES	18
Appendix A: Data Tables.	19
Appendix B: Annotated Bibliography of References Studied.	38
Appendix C: Bibliography	40

PREFACE

It is a truism that no teacher can teach beyond his own knowledge. But the extremely great variety of information that must be known by vocational agriculture teachers in order to conduct good teaching programs presents an array of obstacles that almost prohibits accomplishment. To train today's agriculturists, the vo-ag teacher must know the animal and plant sciences, the mechanical and economical aspects of farming, the occupational requirements of nonfarm agricultural pursuits, etc., ad infinitum. Add to this list all the special educational methods and techniques that he must master and his job becomes even more formidable. It is actually impossible to make a complete list of all that he needs to know. Thus, it becomes evident that he must rely heavily on instructional and reference materials, and such materials must be designed to meet his needs. Likewise, the materials must meet his students' needs, because the vo-ag teacher in reality is a leader of students in their quest for knowledge. To design instructional materials to meet the above demands is by no means a small task, but this entire effort has been directed toward that end.

This report includes information that also served as the basis for a dissertation for the Degree of Doctor of Philosophy earned by the author at Louisiana State University in August 1967.

DEVELOPMENT AND USE OF SUBJECT MATTER MATERIALS
FOR VOCATIONAL EDUCATION IN AGRICULTURE

I. INTRODUCTION

A. The Overall Problem

The purpose of this study was to obtain and interpret data for the purpose of determining how the Subject Matter Service (SMS) of the Department of Agricultural Education at Mississippi State University could more effectively meet Mississippi vo-ag teachers' needs for teaching materials and related services. Three problems were considered with nine objectives focused on their solutions.

Problem I--Evaluation of the subject matter materials developed by the SMS:

1. To determine improvements needed in subject matter references; and

2. To determine the extent to which teachers had an adequate number of copies of the references studied.

Problem II--Determination of sources and usages of teaching materials:

1. To determine the relative importance of the major sources of subject matter materials used by vo-ag teachers;

2. To determine the uses made of the selected subject matter references; and

3. To determine what supplemental references are utilized in instructional programs.

Problem III--Determination of teacher preferences for new subject matter materials and of the method of servicing these individuals:

1. To determine teacher preference for mechanical format of references, such as size, permanency of binding, and type of permanent binding;

2. To determine teacher preference for types and kinds of references;

3. To determine new materials preferred by vo-ag teachers; and

4. To determine teacher attitudes concerning selected policies related to planning, developing, distributing, and using subject matter materials.

This study was conducted on the premise that a treatment of these problems would yield new information that would aid in making appropriate decisions toward improving and up-dating the activities of the Subject Matter Service.

B. Need for the Study

Vocational education in agriculture (vo-ag) has been an integral part of public education in Mississippi for almost half a century (13:5). Throughout this 50-year period, vo-ag teachers have been confronted with many problems, one of which has been that of making intelligent decisions as to what to teach. Teaching programs for the most part were structured primarily "to train present and prospective farmers for proficiency in farming" as required by the Smith-Hughes Act in 1917. The controlling purpose, as stated in Section 10 of this Act, was that "such education shall be to fit for useful employment of less than college grade and be designated to meet the needs of persons over fourteen years of age who have entered upon or who are preparing to enter upon the work of the farm or of the farm home" (8:748).

In addition to the problem of determining what to teach, the instructors have been confronted with the necessity of securing adequate reference materials directly related to their curriculum objectives. From the very beginning of vocational agriculture in Mississippi, teachers voiced the desire for some systematic source of teaching materials to aid in their instructional programs (16:256). This need for help was aptly expressed in later years by Ridenour and Woodin (12:1-2), who said:

> The field of agriculture is broad and contains many specialized areas. Due to the limitations of time, teacher ability, and the infeasibility of one person becoming proficient in the many subject matter areas there has been a recognized need for providing help to teachers in the form of instructional materials.
>
> The problems of teachers of vocational agriculture relating to curricular materials can be divided into three main areas. (1) The problem of keeping abreast of vast amounts of technical knowledge in the various fields of agriculture. (2) The problem of finding time to become informed with technical and professional knowledge. (3) The problem of obtaining or preparing materials that are structured in a logical sequence for teaching.

In 1934 a service to provide reference materials for vo-ag departments was organized as a joint effort between the Mississippi State University Agricultural Experiment Station and the State Vocational Board (16:256). Later, the SMS became an integral part of the University's Agricultural Education Department.

Instructional materials prepared by the SMS have consisted primarily of printed matter oriented toward training farmers and prospective farmers. Such materials have been in the form of illustrated pamphlets, job operation sheets, teacher guides, wall charts, and bulletins. These bulletins, known as reference units, have been primarily of the comprehensive kind, each comprising a series of

individual subject matter units related to a particular enterprise or broad area of agricultural instruction. Ten of these references constituted the materials of this kind in use in departments of vocational agriculture when data were gathered for this study. (See Annotated Bibliography, Appendix B, page 38, for a description of the ten references.)

In addition to preparing teaching materials, the SMS selects and procures materials from other sources and distributes them to teachers. A full-service film library was added in 1946. The library now contains 1,513 copies of 16 mm film covering 628 topics (42:1), and has supplied Mississippi vo-ag teachers with most of the film used in their instructional programs.

No charge is made for use of the printed materials or for use of the film; however, instructors do provide the necessary postage for returning the film to the SMS. Vo-ag teachers have been offered only limited assistance in making maximum effective use of these materials.

Under the Smith-Hughes Act of 1917, and several subsequent acts, the purpose of vocational education in agriculture was to train for proficiency in farming (8:747-748). The Vocational Education Act in 1963 amends these provisions to provide "...for vocational education in any occupation involving knowledge and skills in agricultural subjects, whether or not such occupation involves work of the farm or of the farm home..." (8:758). Thus, in amending the provisions of the earlier Acts, Congress set the stage for revolutionizing vo-ag training programs.

In consideration of the provisions specified in the Vocational Education Act, new objectives and purposes for vocational education in agriculture were developed (16:iv, 4-5). These goals, national in scope, were designed primarily for use by vo-ag teachers as basic guides in developing training programs. However, these aims also serve as useful guides for those concerned with supplying instructional materials to teachers, as well as for other leaders in the field of vocational education in agriculture in discharging their various responsibilities. The six major objectives for vocational and technical education in agriculture are:

1. To develop agricultural competencies needed by individuals engaged in or preparing to engage in production agriculture;

2. To develop agricultural competencies needed by individuals engaged in or preparing to engage in agricultural occupations other than production agriculture;

3. To develop an understanding of and appreciation for career opportunities in agriculture and the preparation needed to enter and progress in agricultural occupations;

4. To develop the ability to secure satisfactory placement and to advance in an agricultural occupation through a program of continuing education;

5. To develop those abilities in human relations which are essential in agricultural occupations; and

6. To develop the abilities needed to exercise and follow effective leadership in fulfilling occupational, social, and civic responsibilities.

Thus, the provisions of the new Act, along with the resultant major objectives for vocational and technical education in agriculture, change the entire outlook for the preparation of teaching materials, both as to quantity and as to kind. Consequently, to keep abreast of the growing needs of teachers for instructional materials and related services, the MSU Subject Matter Service must be geared to meet these needs.

Meeting these needs necessitates the formulation and implementation of appropriate decisions. Basic to judicious decision-making are sound data, properly interpreted. It was presumed that a treatment of the problems involved in this study would yield new information so that appropriate decisions could be made for improving the instructional materials and services rendered to Mississippi vo-ag teachers.

II. PROCEDURES

A. Problem Design

The research utilized the description method with the group-interview technique. Two hundred and seventy-six experienced Mississippi vo-ag teachers provided data. Also involved in the undertaking were personnel in: The Departments of Agricultural Education at Mississippi State University and at Alcorn A & M College; the Research Coordinating Unit for Vocational and Technical Education at Mississippi State University; and the Agricultural Section of the Division of Vocational and Technical Education in the State Department of Education. Resources of the Mississippi State University Computing Center were used in processing the data.

B. Collection and Treatment of Data

A schedule was prepared for the orderly collection of data. In addition to its "general information" section, the major divisions were:

Part I--An Evaluation of the Quality of Selected Subject Matter References;

Part II--An Evaluation of the Quantity of Selected Subject Matter References;

Part III--Major Sources of Subject Matter Materials;

Part IV--Use of Selected Subject Matter References;

Part V--Selected Supplemental Publications in Departmental Library;

Part VI--Teacher Preference on Subject Matter Materials;

Part VII--Need for New Subject Matter Materials; and

Part VIII--Teacher Attitude Concerning Selected Policies.

Data were gathered on this validated, pre-tested schedule during nine group meetings with Mississippi vo-ag teachers who had been assembled by State supervisory personnel. These data were programmed for IBM processing and subsequently organized in Tabular form (see Appendix A).

Statistical techniques involved the computations of frequency and percentage distributions and weighted mean scores.

III. SUMMARY OF FINDINGS

Problem I

An Evaluation of The Subject Matter Materials Developed by The Subject Matter Service

Objective 1.

Teachers evaluated the quality of the 10 selected references which they and their students used. These publications, prepared by the MSU Subject Matter Service, were subject matter references, each comprising a series of individual instructional units for an enterprise or broad area of agricultural instruction (See Annotated Bibliography, Appendix B). Adjudging the strengths and weaknesses of the references was believed to be helpful as a guide for determining what improvements are needed in these references and in similar materials to be prepared in the future.

Four major evaluative criteria served as standards for the evaluation. They were: (1) printed subject matter content; (2) illustrations and photographs; (3) readability; and (4) format. These major criteria were further divided into 13 sub-criteria. Results of the rating follow.

A. None of the references were rated "superior" (Excellent) according to any of the four major evaluative criteria, nor under any of the 13 sub-criteria, although some ratings closely approached this level.

B. All references were rated "satisfactory" (Good) under each major criterion.

C. While no ratings of "poor" were made, some mean scores indicated specific weaknesses (Fair) as follows.

   1. Much of the subject matter in the Landscaping, Dairy, and Hog references appeared to be out-of-date. There also was some indication of considerable out-of-date information in the Beef Cattle reference.

   2. Too few illustrations and photographs were used in the basic principle references on Animal Science, Plant Science, and Soil Science. There was some indication of the need for fewer pictures of one particular breed in the Beef Cattle reference. More illustrations and photographs on design and on species of shrubs were needed in the Landscaping reference. More photographs of classes of animals were needed in the Judging reference.

   3. Eight-point print used in two references was rated Fair, while the 10-point size in the others was rated Good.

4. Covers and bindings on all 10 references were rated Fair in durability. The lowest durability was found to be in the Landscaping, Dairy, Hog, Egg, Beef Cattle, and Judging references. Although the covers and bindings of the Plant Science, Animal Science, Soil Science, and Corn References were rated only Fair in durability, their mean scores closely approached the rating level of Good.

Objective 2.

A. Teachers indicated the degree to which they had adequate numbers of copies of each reference. The guideline of one copy per student in the largest class using each publication was viewed as being "adequate". Generally, there were too few copies of each reference for the numbers of students serviced. The extent to which teachers indicated they had sufficient copies of each reference follows:

1. One copy of the Egg, Dairy, Hog, Beef Cattle, and Judging references for two students.

2. One copy of the Landscaping, Plant Science, Soil Science, and Animal Science references was available for three-to-four students.

3. More than four students shared each copy of the Corn reference.

Problem II

A Determination of Sources and Usage of Teaching Materials

Objective 1.

A. Teachers reported, in order of importance to them, the following sources of subject matter materials: (1) MSU Agricultural Education Subject Matter Service; (2) Mississippi Agricultural Experiment Station; (3) Mississippi Cooperative Agricultural Extension Service and the State Textbook Purchasing Board; (4) USDA; and (5) Other sources -- companies supplying magazines, other materials for purchase, and free materials.

Objective 2.

A. Based on the numerical weightings of 4 = Great Extent, 3 = Moderate Extent, 2 = Some Extent, and 1 = No Extent, the rankings of 10 selected subject matter references according to use were: (1) Beef Cattle Production, 3.7; (2) Hog Production, Basic Principles of Plant Science, Basic Principles of Animal Science, and Judging Livestock and Poultry, 3.5 each; (3) Basic Principles of Soil Science, 3.3; (4) Corn, 3.1; (5) Dairy Production, and Landscaping Home Grounds, 2.9 each; and (6) Egg Production, 2.2. The composite mean score for the six livestock references was 3.2, the same as for the four agronomic publications.

B. The 10 references were used primarily as follows:

1. Respondents indicated that the Landscaping publication was used primarily as a basic teacher reference. However, 44 percent of them indicated that it was used primarily as a basic student reference.

2. The other nine references were used primarily as basic student references.

3. A majority of the respondents stated that some of the publications were used primarily as basic teacher references because of the very limited number of copies in their libraries. Their comments concerned the references on Plant Science, Animal Science, Soil Science, and Corn.

Objective 3.

The extent to which teachers received a selected group of reference material follows:

A. Few of the selected reference materials were received by vo-ag teachers. The most received references and the percentage of teachers receiving them were: (1) Mississippi Farm Research,97.8; (2) Mississippi Farm Report, 68.1; (3) Mississippi ACP Handbook (for 1966), 60.5; (4) Mississippi Market Bulletin, 56.2; (5) USDA Yearbooks, 52.9; (6) Agricultural Situation, 43.1; and (7) Demand and Price Situation , 39.9.

B. Thirty-eight magazines and similar materials of use in vo-ag departments were received by the teachers. The seven most received materials and the percentage of teachers receiving them follows: (1) Agricultural Education Magazine, 90.2; (2) Progressive Farmer, 82.2; (3) National Future Farmer, 79.3; (4) Farm Journal, 76.4; (5) Mississippi Farmer, 47.5; (6) Hoard's Dairyman, 25.4; and (7) Doane's Agricultural Report, 17.8.

Only 2 percent of the teachers reported receiving any of the 31 remaining materials, mostly breed association magazines.

Problem III

A Determination of Teacher Preferences for New Subject Matter Materials and of the Method of Servicing These Individuals

Objective 1.

A. Teacher preference for mechanical format of references follows:

1. No significant preference was shown for either the 6- by 9- inch or the $8\frac{1}{2}$- by 11- inch reference.

2. Of the 140 teachers who preferred the larger reference, 55.0 percent preferred only one column of print per page.

3. Almost three-fourths of the teachers preferred a permanent, non-refill type of reference binding.

4. The non-spiral (stapled-and-taped) type of bindings was preferred to the spiral type by almost two-thirds of the respondents.

Objective 2.

A. Eighty-three percent of the respondents preferred both subject matter references and separate but related teacher guides as compared to 15.6 percent who preferred only subject matter references; the reamining 1.4 percent preferred only teacher guides.

B. Almost 78 percent of the teachers preferred the kind of subject matter reference that contains a series of individual subject matter units related to a single enterprise or broad area of instruction. Approximately 16 percent facored the kind that contains a series of related units for several enterprises.

Objective 3.

Teachers expressed their need for new subject matter references and for supplementary teaching aids.

Reference needs were shown for two kinds, namely: (1) comprehensive-unit references, each publication comprising a complete series of individual subject matter units for a single-enterprise or broad area of instruction; and (2) individual-unit references for a specific instructional area. Findings relative to expressed needs for new references and for supplementary teaching aids are presented in subsequent paragraphs. (The five most desired in each category are shown in order of preference.)

A. New Comprehensive-Unit References

(a) Production Farming: (1) pastures; (2) agricultural maintenance--arc welding, gas welding, cold metal work, and tool fitting; (3) preventive maintenance and operation of small gas engines; (4) basic economic principles in farm management; and (5) agricultural construction -- carpentry.

(b) Career Opportunities and Leadership: Preferences were for career opportunity references on (1) production farming; (2) agricultural service; (3) farm machinery sales and service; (4) farm supplies and equipment; and (5) ornamental horticulture.

(c) Off-Farm Agricultural Occupations: (1) basic economic principles in agribusiness; (2) steps and procedures to organize an agribusiness; (3) nature and operations of feed and farm supply stores; (4) financing and managing agribusinesses; and (5) nature and operations of farm implement dealerships.

B. New Individual-Unit References

(1) Controlling weeds in pastures; (2) controlling weeds in cotton; (3) controlling weeds in corn; (4) controlling weeds in soybeans; and (5) feeding beef cattle.

C. Supplementary Teaching Aids

(1) Illustrated pamphlets, job operation sheets, information sheets, and similar materials; (2) overhead projection transparencies; (3) 16 mm. films; (4) wall charts; and (5) 35 mm. filmstrips.

Objective 4.

A. Teachers suggested that the following four groups should be represented on a committee to plan and develop references, such as: Department of Agricultural Education staffs, teachers of vocational agriculture, state supervisory staff, and specialists from technical subject matter fields. They were "undecided" whether adult vocational agriculture students should be represented, and their attitude was negative toward inclusion of high school students on such a committee.

B. Teachers agreed that reference manuscripts should be reviewed for adequacy and accuracy of coverage of information by specialists in technical subject matter fields.

C. Moreover, they agreed on the need for assistance from teacher-training and supervisory staffs to help them to more effectively interpret and use new teaching materials.

D. No clear-cut agreement was shown for inventorying major subject matter materials as local school property in order to promote retention of such materials in departmental libraries.

IV. CONCLUSIONS

The following conclusions are based on the findings of this study and are presented according to contributory objectives comprising each of the three specific problems involved.

Problem 1

Objective 1.

None of the 10 selected references prepared by the Subject Matter Service were superior in quality, but all were satisfactory (Good).

Specific weaknesses in the quality of several references apparently impaired their effectiveness as instructional materials. These deficiencies indicated the need for certain improvements in the 10 publications and ways in which such improvements could be effected in future references produced by the SMS.

The Landscaping, Dairy, and Hog references appeared to be in need of immediate revision, primarily because much of the subject matter was judged as being out-of-date. While evident to a lesser degree than in the three aforementioned references, considerable information in the Beef Cattle publication also needs up-dating. Information in the latter reference was considerably out-of-date in the units dealing with production possibilities and in controlling diseases and parasites.

It was obvious that there was a very inadequate number of visual aids in the basic principles references on Plant Science, Animal Science, and Soil Science. Moreover, more landscape design illustrations, and photographs of shrubs were needed in the Landscaping reference and additional photographs of animal classes should have been included in the Judging publication.

The investigation revealed that a larger number of visual aids should be used in publications developed by the SMS. If implemented, this would doubtless necessitate the employment of professional art and photographic personnel.

Eight-point print is too small to use in the type of reference materials studied, while 10-point type is adequate.

Greater reference cover and binding durability is needed. Respondents expressed considerable dissatisfaction with the lack of cover and binding durability of the Landscaping, Dairy, Beef Cattle, Hog, Egg, and Judging publications.

Objective 2.

Teachers had too few copies of each of the 10 specified references. (An accepted principle is that effective teaching and learning are in some measure dependent upon the quantity of available references, therefore, teaching-learning situations in the departments may have been below

what they doubtless would have been had sufficient copies of these references been available.)

Apparently, several factors contributed to the deficient number of copies of reference materials that teachers had. Among these were the following: (1) too few copies were provided by the SMS; and (2) many of these materials were not retained in the departments, due, in part, to many teachers carrying materials with them when employment was terminated.

Other conclusions were: (1) additional state or other funds are needed for providing departments with an adequate number of copies of reference materials; (2) adequate local funds are needed for purchasing materials of instruction other than those provided free by the SMS and other sources; and (3) a sound policy is needed to promote retention of subject matter materials in departmental libraries.

Problem II

Objective 1.

It was obvious, from the findings, that the Subject Matter Service of the Department of Agricultural Education at Mississippi State University has been the teachers' most important source of instructional materials. The Mississippi Agricultural Experiment Station was found to be the next most important source. (Both of these sources furnish their materials to vo-ag teachers on a "no-cost" basis. A notable exception is that certain Experiment Station publications are purchased with vocational funds and distributed to teachers by the SMS.)

Teachers received too few reference books from the State Textbook Purchasing Board; also teachers do not obtain many valuable free references from the USDA and similar sources. Thus, need exists for acquainting the respondents with available materials, and for encouraging and assisting them in obtaining additional materials from all available sources. Likewise, the SMS could play an increasingly important role in disseminating the findings of research information that emanates from the Mississippi Research Coordinating Unit for Vocational-Technical Education and similar agencies.

Evidently, very few reference materials were purchased by teachers from commercial sources. This implies that sufficient funds may not be provided for local departments for purchasing such materials.

Objective 2.

Extensive use was made of the Beef Cattle, Hog, and Judging references, and of the basic principle references on Plant Science and Animal Science. With the exception of the Egg Production publication, the references studied were used to a sufficient extent to justify their cost and preparation.

Readability of the references appeared to have had little influence upon differences in the extent-of-use, as evidenced by the very narrow range of mean scores for this attribute in all references evaluated.

Findings clearly indicated that publications were used in the manner intended, i.e., primarily as basic student (library) references. Furthermore, it was concluded that some of these materials would have been used by students to a greater extent than indicated if teachers had had sufficient copies of the references. This conclusion was strongly supported by teacher comments.

Objective 3.

If teachers and students are to keep abreast of rapidly changing economic conditions and developments in their field, it is imperative that they have a greater variety of periodical and similar materials than was indicated in the findings of this investigation. Consequently, there is a need for developing in teachers a greater appreciation for the importance of such reference materials and how they may be more effectively used. This finding further implies that: (1) adequate funds have not been provided for purchasing materials of instruction; (2) teachers have not availed themselves of the opportunity to obtain free materials; and (3) the instructors have not been aware that certain pertinent materials were available.

Problem III

Objective 1.

Size, or width and length, of references was of little concern to teachers. Nor was it shown that there was a clear-cut preference for either one or two colums of print per page in $8\frac{1}{2}$- by 11-inch publications.

It was also concluded that teachers preferred permanently bound references (the non-refill type) and publications in which pages and covers were stapled together and taped.

Objective 2.

Providing teachers with both subject matter references and separate, but related, teacher guides will improve the quality and effectiveness of instruction.

Respondents prefer subject matter references of the kind that comprise a series of individual instructional units related to a single enterprise or broad area of agricultural instruction.

Objective 3.

Findings not only indicated that teachers need a more adequate quantity of materials prepared by the SMS, but also a preponderance of new materials.

Moreover, it was concluded that teachers have great need for new reference materials on pastures; economic principles in agribusiness; agricultural mechanics (Table XI); career opportunities in agricultural occupations; basic social and educational competencies essential in agricultural occupations; organizing agribusinesses; nature and operations of feed and farm supply stores; nature and operations of farm implement dealerships; financing and managing agribusinesses; and controlling weeds.

Objective 4.

There should be a state-wide committee charged with the responsibility of planning and developing reference material outlines for publications prepared by the SMS. Moreover, representatives from the Departments of Agricultural Education, vo-ag teachers, state supervisory staff, and specialists in technical subject matter fields should comprise this committee.

Assistance from specialists in subject matter fields is needed for reviewing reference manuscripts to assure adequate and accurate coverage of information in references prepared by the SMS.

Teachers need additional assistance from teacher-training and state supervisory staffs to help them more effectively interpret and use new subject matter materials. Such assistance might include pilot workshops in which laboratory situations would involve vo-ag students. In a situation of this nature, teachers would observe teaching-learning situations conducted by teacher-training and/or state supervisory staffs.

There is a need for formulating and implementing a sound policy to promote the retention of subject matter materials in vo-ag departments.

V. RECOMMENDATIONS

These recommendations are for improving the materials and services of the Subject Matter Service in the Department of Agricultural Education at the Mississippi State University. They are based upon teacher expression of needs and a review of related literature, and are presented for consideration by appropriate persons or groups.

1. That the Landscaping, Dairy, and Hog references be immediately revised to up-date subject matter content and to effect other needed improvements, such as additional illustrations and photographs.

2. That an adequate number of appropriate visual aids be put in present references when they are revised, giving special attention to providing a greater quality of such aids in the basic principle references on Plant Science, Soil Science, and Animal Science.

3. That an adequate number of illustrations and photographs be included in new references prepared by the SMS.

4. That covers and bindings used on references prepared by the SMS be at least as durable as those on the Plant Science, Soil Science, Animal Science, and Corn references. These publications were covered with 90-pound "Carnival" grade material. Both the covers and pages were stapled and bound with "Holland" gummed tape.

5. That two columns of print be used per page in the $8\frac{1}{2}$- by 11-inch size references as a means of improving content readability.

6. That 10-point be used in the body of reference materials.

7. That policies be established by and through efforts of the Division of Vocational and Technical Education of the Mississippi State Department of Education which would assure adequate subject matter materials being placed in local vo-ag department libraries. These are policies that would (a) establish standards and requirements for kinds and quantities of materials needed; (b) provide departments with an adequate quantity of materials furnished by the SMS; (c) require local schools to provide funds for supplementing materials not provided by the SMS; (d) promote retention of major subject matter materials in departmental libraries; and (e) assure teachers of a more equitable quantity of the reference books that are available from the State Textbook Purchasing Board.

8. That teachers be encouraged to and assisted in obtaining reference materials available from sources other than the SMS. One means of providing such assistance would be for SMS personnel to periodically provide teachers with an annotated bibliography of available materials.

9. That a statewide Subject Matter Service Advisory Committee be established to include members of the Departments of Agricultural Education, and representatives from the state supervisory staff, vo-ag teachers, and specialists in technical subject matter fields.

10. That the practice be continued of securing assistance from specialists in technical subject matter fields for the review of manuscripts during development to assure adequate and accurate coverage of information in reference materials prepared by the SMS.

11. That teachers be provided with adequate assistance through in-service programs to enable them to more effectively interpret and use new subject matter materials. Such assistance might include pilot workshops in which laboratory situations would involve vo-ag students. In a situation of this nature, teachers would observe teaching-learning situations conducted by teacher-training and/or state supervisory staffs. Additionally, the usefulness of such materials could be explained and interpreted during small group discussions in workshops, state conferences, and similar meetings.

12. That separate but related teacher guides be provided with subject matter references prepared by the SMS.

13. That subject matter references developed by the SMS contain a series of individual units for an enterprise or broad area of agricultural instruction. When needed, individual unit references should be prepared.

14. That priority be given to providing teachers with new subject matter materials in the following instructional areas: Pastures; Economic Principles in Farm Management; Economic Principles in Agribusiness; Agricultural Maintenance--arc welding, gas welding, cold metal work, and tool fitting; Preventive Maintenance and Operation of Small Gas Engines; Agricultural Construction--carpentry; Basic Social and Educational Competencies Essential in Non-Farm Agricultural Occupations; Organizing Agribusinesses; Nature and Operations of Feed and Farm Supply Stores; Nature and Operations of Farm Implement Dealership; Financing and Managing Agribusinesses; and Controlling Weeds in Pastures, Cotton, Corn, and Soybeans.

15. That teachers be provided with more illustrated information sheets and job operation sheets, and with overhead projection transparencies.

16. That improvements be made in the 16 mm film library operated by the SMS. These improvements are to include the purchase of new title prints, necessary replacements of those currently in the library, and adequate film servicing equipment.

17. That further study be made of the feasibility of preparing permanently bound references.

18. That studies be conducted to determine the feasibility of using programmed instructional materials and other such media in vo-ag departments.

The 1963 Vocational Education Act (Federal) changes the entire outlook for the preparation of teaching materials, both as to quality and as to kind. The Act now provides for vocational education both in off-farm agricultural occupations and in production agriculture. Moreover, jobs are constantly changing, i.e., new jobs are emerging, and old ones are disappearing. All this necessitates the development of new training programs, and the deletion of others, thus requiring a continuous flow of new teaching materials. It might be said that vocational curricula must be in a perpetual state of revision to keep up with and provide for these occupational changes.

Much has been done by the SMS to supply Mississippi vo-ag teachers with instructional materials. However, it is evident from the findings of this study, the provisions of the 1963 Act for expanding vocational education in agriculture, and the rapid technological changes occurring in this field, that the current activities are not meeting teacher needs. Consequently, to keep abreast of the growing needs of teachers of instructional materials and related services, the SMS must be geared to meet these needs. Undoubtedly, this will necessitate additional facilities and personnel to enable it to function as a complete curriculum materials laboratory.

VI. APPENDICES

APPENDIX A

Table I An Evaluation of Selected Subject Matter References

Evaluative Criteria	Titles of References: Land-scaping Home Grounds	Dairy Pro-duction	Hog Pro-duction	Egg Pro-duction	Beef Cattle Pro-duction	Basic Prin.of Plant Science	Basic Prin.of Soil Science	Basic Prin.of Animal Science	Judging Lvstk.& Poultry	Corn
Printed Subject Matter Content	Weighted Mean Scores*									
Completeness of coverage	3.2	3.3	3.4	3.2	3.4	3.3	3.3	3.3	3.4	3.4
Up-to-date information	2.6	2.8	2.7	3.8	3.1	3.9	3.8	3.8	3.8	3.8
Applicability	3.3	3.3	3.4	3.2	3.5	3.7	3.6	3.7	3.6	3.6
Wtd.Ptd.Sub.Matt.Mean Score*	3.0	3.1	3.2	3.4	3.3	3.6	3.6	3.6	3.6	3.6
Illustrations and Photographs										
Number	3.2	3.2	3.2	3.2	3.5	2.8	2.8	2.5	3.2	3.1
Variety	3.2	3.2	3.2	3.1	3.3	3.1	3.1	3.1	3.2	3.2
Quality	3.4	3.3	3.3	3.3	3.4	3.3	3.2	3.2	3.3	3.4
Originality	3.0	3.2	3.2	3.2	3.2	3.3	3.3	3.4	3.2	3.4
Wtd.Ill.& Photo. Mean Score*	3.2	3.2	3.2	3.2	3.4	3.1	3.1	3.1	3.2	3.3
Readability										
Vocabulary	3.3	3.4	3.4	3.4	3.4	3.3	3.3	3.3	3.4	3.4
Style of writing	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Wtd. Readability Mean Score*	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Format										
Subject matter organization	3.1	3.4	3.5	3.4	3.5	3.5	3.5	3.5	3.5	3.5
Size and clearness of print	2.9	2.9	3.4	3.6	3.5	3.5	3.5	3.5	3.5	3.5
Cover attractiveness	3.6	3.3	3.4	3.4	3.4	3.3	3.1	3.0	3.4	3.1
Cover and binding durability	2.1	2.1	2.1	2.2	2.1	2.9	2.9	2.8	2.2	2.9
Wtd. Format Mean Score*	3.0	3.0	3.1	3.2	3.1	3.3	3.3	3.2	3.2	3.3
Wtd. Composite Mean Score*	3.1	3.1	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.4

* Excellent = 4, Good = 3, Fair = 2, Poor = 1. (Frequency distributions of responses are shown in Appendix Tables XXI-XXX).

Table II. Quantity of selected subject matter references in departmental libraries

Title of reference	Weighted mean score*
Egg Production	3.6
Dairy Production	3.5
Hog Production	3.5
Beef Cattle Production	3.2
Judging Livestock and Poultry	3.0
Landscaping Home Grounds	2.8
Basic Principles of Plant Science	2.2
Basic Principles of Soil Science	2.2
Basic Principles of Animal Science	2.1
Corn	1.9
Composite mean score (all references)	2.8

*5 = More than adequate, more than one copy per student
4 = Adequate, one copy per student
3 = Slightly inadequate, one copy for each 2 students
2 = Very inadequate, one copy for each 3 to 4 students
1 = Highly inadequate, less than one copy for each 4 students

(Based on number of students in largest class using reference.)

Table III. Relative importance of sources of subject matter materials to teachers

Sources	Weighted mean score*	Rank of source
Agricultural Education Subject Matter Service	5.9	1
Agricultural Experiment Station	4.4	2
Cooperative Agricultural Extension Service	3.3	3
State Textbook Purchasing Board	3.3	3
United States Department of Agriculture	2.8	5
Other**	1.3	6

*Rank weightings: 1 = 6, 2 = 5, 3 = 4, 4 = 3, 5 = 2, 6 = 1.

**Companies supplying magazines, teaching materials for purchase, free materials, et cetera.

Table IV. Extent which selected references were used in instructional programs

Title of reference	Extent-of-use: Weighted mean score*	Rank
Beef Cattle Production	3.7	1
Hog Production	3.5	2
Basic Principles of Plant Science	3.5	2
Basic Principles of Animal Science	3.5	2
Judging Livestock and Poultry	3.5	2
Basic Principles of Soil Science	3.3	6
Corn	3.1	7
Dairy Production	2.9	8
Landscaping Home Grounds	2.9	8
Egg Production	2.2	10

*Great extent = 4, moderate extent = 3, some extent = 2, no extent = 1.

Table V. Types-of-use of selected subject matter references in instructional programs

Title of reference	Types-of-use: Basic student (lib.) reference Number*	Percent	Basic teacher reference Number*	Percent
Beef Cattle Production	257	93.8	17	6.2
Hog Production	250	90.6	26	9.4
Basic Principles of Plant Science	180	65.5	95	34.5
Basic Principles of Animal Science	196	71.3	79	28.7
Judging Livestock and Poultry	256	92.8	20	7.2
Basic Principles of Soil Science	175	64.1	98	35.9
Corn	188	69.4	83	30.6
Dairy Production	205	76.2	64	23.8
Landscaping Home Grounds	121	44.2	153	55.8
Egg Production	141	59.2	97	40.8

*For each reference the total number of responses for the two types-of-use yield the total number of respondents who indicated each reference had been used: Beef Cattle Production, 274; Hog Production, 276; Basic Principles of Plant Science, 275; Basic Principles of Animal Science, 275; Judging General Livestock and Poultry, 276; Basic Principles of Soil Science, 273; Corn, 271; Dairy Production, 269; Landscaping Home Grounds, 274; Egg Production, 238.

Table VI. Extent which teachers of vocational agriculture receive selected references

Title of publications	Teachers receiving publications		Rank of publication
	Number	Percent	
Mississippi Farm Research	270	97.8	1
Mississippi Farm Report	188	68.1	2
Mississippi ACP Handbook, 1966 (ASCS)	167	60.5	3
Mississippi Market Bulletin	155	56.2	4
USDA Yearbooks	146	52.9	5
Agricultural Situation	119	43.1	6
Demand and Price Situation	110	39.9	7
Mississippi Agricultural Statistics	75	27.2	8
Agricultural Census, 1964, Miss. and County	70	25.4	9
Agricultural Marketing	70	25.4	9
Agricultural Research, USDA	68	24.6	11
Agricultural Prices	64	23.2	12
Catalog of Selected Charts (Available from USDA)	52	18.8	13
Cotton Situation	49	17.8	14
Crop Production	40	14.5	15
Farm Income Situation	35	12.7	16
Poultry & Egg Situation	31	11.2	17
Feed Situation	24	8.7	18
Livestock & Meat Situation	21	7.6	19
Fact Book of U.S. Agriculture	20	7.2	20
National Food Situation	19	6.9	21
Dairy Situation	13	4.7	22
Livestock, Meat, Wool Market News	8	2.9	23
Marketing and Transportation Situation	7	2.5	24
Vegetable Situation	7	2.5	24
Fruit Situation	4	1.4	26

Table VII. Extent which teachers of vocational agriculture receive selected magazines and similar materials

Title of magazine	Teachers receiving magazines and similar materials		Rank of publi-cation
	Number	Percent	
Agricultural Education Magazine	249	90.2	1
Progressive Farmer	227	82.2	2
National Future Farmer	219	79.3	3
Farm Journal	211	76.4	4
Mississippi Farmer	131	47.5	5
Hoard's Dairyman	70	25.4	6
Doane's Agricultural Report	49	17.8	7
Mississippi Cattle News	39	14.1	8
Livestock Producer	24	8.7	9
Mechanics Illustrated	14	5.1	10
Hereford Journal	11	4.0	11
Farm Quarterly	10	3.6	12
Delta Farm Press	8	2.9	13
Workbench	7	2.5	14
Mississippi Valley Stockman-Farmer	6	2.2	15
Duroc News	6	2.2	15
Jersey Bulletin	5	1.8	17
Soybean News	4	1.4	18
Ayrshire Digest	3	1.1	19
Farmer's Digest	3	1.1	19
Mississippi Angus News	2	0.7	21
Arts and Crafts	2	0.7	21
National Hog Farmer	2	0.7	21
American Angus News	2	0.7	21
The American Landrace	1	0.4	25
Poultry Tribune	1	0.4	25
Beekeeper's Journal	1	0.4	25
Better Homes and Gardens	1	0.4	25
Farm Weekly	1	0.4	25
Holstein-Friesian	1	0.4	25
Cattle Business	1	0.4	25
Beef Breeder News	1	0.4	25
Agricultural Mechanic	1	0.4	25
Southern Living	1	0.4	25
Hampshire Herdsman	1	0.4	25
Yorkshire Journal	1	0.4	25
Angus News	1	0.4	25
Kiplinger's Newsletter			

Table VIII. Teacher preference for mechanical format of subject matter references

Mechanical Format	Teachers	
	Number	Percent
Size of Reference		
6- X 9-inch	136	49.3
$8\frac{1}{2}$- X 11-inch	140	50.7
Number Columns Print Per $8\frac{1}{2}$- X 11-inch Page		
One column	77	55.0
Two columns	63	45.0
Permanency of Binding		
Non-Permanent -- refill type	71	25.7
Permanent -- non-refill type	205	74.3
Type of Permanent Binding		
Spiral	95	34.4
Stapled, and cemented or taped (non-spiral)	181	65.6

Table IX. Teacher preference for types of references

Types	Teachers	
	Number	Percent
Subject Matter Reference (only)	43	15.6
Teacher Guide (only)	4	1.4
Subject Matter Reference and Teacher Guide	229	83.0

Table X. Teacher preference for kinds of subject matter references

Kinds	Teachers	
	Number	Percent
Single Enterprise, Series of Individual Units	215	77.9
Individual Unit	17	6.2
Multiple Enterprises, Series of Related Units	44	15.9

Table XI. Need for new references, each comprising a series of individual subject matter units related to an enterprise or area of instruction in production agriculture

Enterprise or Area of Instruction	Teacher Replies* Number	Percent	Rank
Pastures	162	58.7	1
Agri. Maint.--arc welding, gas welding, cold metal work and tool fitting	148	53.6	2
Prev. Maint. & Oper. of Small Gas Engines	142	51.5	3
Basic Economic Prin. in Farm Management	131	47.5	4
Agricultural Construction--carpentry	116	42.0	5
Electricity	115	41.7	6
Preventive Maint. & Oper. of Tractors	91	33.0	7
Prev. Maint. & Oper. of Agri. Mach. & Equipt.	90	32.6	8
Prev. Maint. & Oper. of Elec. Mtrs.	75	27.2	9
Forestry	61	22.1	10
Basic Principles of Genetics	50	18.1	11
Agric. Const.--concrete & masonry	45	16.3	12
Hay Crops	38	13.7	13
Silage Crops	36	13.0	14
Cotton	34	12.3	15
Broilers	19	6.9	16
Agric. Const.--fencing	18	6.5	17
Farm Safety and Sanitation	9	3.2	18

* Each respondent indicated five choices.

Table XII. Need for new references, each comprising a series of individual subject matter units related to an area of instruction in agricultural career opportunities and leadership

Area of Instruction	Teacher Replies* Number	Percent	Rank
Career Opportunities:			
Production Agriculture	160	58.0	1
Agricultural Service	147	53.3	2
Farm Machinery Sales & Service	145	52.5	3
Farm Supplies & Equipment	138	50.0	4
Ornamental Horticulture	136	49.3	5
Livestock & Poultry Industries	121	43.8	6
Wildlife & Recreation	116	42.0	7
Crops, Forestry & Soil Conservation	111	40.2	8
Farm Service	76	27.5	11
Leadership:			
Parliamentary Procedure	110	39.9	9
Basic Social & Educ. Competencies Essential in Agric. Occupations	92	33.4	10
Agric. Leadership, Cooperation & Citizenship	28	10.1	12

* Each respondent indicated five choices.

Table XIII. Need for new references, each comprising a series of individual subject matter units related to an area of instruction in off-farm agricultural occupations

Area of Instruction	Teacher Replies* Number	Percent	Rank
Basic Economic Prin. in Agribusiness	218	79.0	1
Steps and Procedures to Organize an Agribusiness	184	66.7	2
Nature & Operations of Feed & Farm Supply Stores	180	65.3	3
Financing & Managing Agribusinesses	170	61.6	4
Nature & Operations of Farm Implement Dealerships	150	54.4	5
Types, Functions, Location, Size & Scope of Operations--Selected Agribusiness Firms in the United States & Mississippi	140	50.7	6
Role & Effect of Government in Agribusiness, Inc. Federal, State & Local Governments	120	43.5	7
Role of Employees in Agribusiness	111	40.3	8
Nature & Operations of Selected Agribusiness Processing Plants	106	38.4	9

* Each respondent indicated five choices.

Table XIV. Need for new individual unit reference materials in crop enterprises

Areas of instruction	Teacher replies* Number	Percent	Rank
Controlling Weeds in Pastures	126	45.7	1
Controlling Weeds in Cotton	120	43.5	2
Controlling Weeds in Corn	101	36.6	3
Controlling Weeds in Soybeans	78	28.3	4
Planning Pastures	31	11.2	5
Fertilizing Pastures	21	7.6	6
Controlling Cotton Insects	16	5.8	7
Controlling Orchard Pests	12	4.3	8
Controlling Truck Crop Pests	11	4.0	9
Storing Silage	9	3.3	10
Controlling Pecan Disease & Insects	7	2.5	11
Controlling Weeds in Truck Crops	6	2.2	12
Controlling Orchard Diseases	6	2.2	12
Controlling Corn Diseases & Insects	5	1.8	14
Selecting a Soybean Variety	4	1.4	15
Controlling Corn Insects	4	1.4	15
Harvesting Silage	3	1.1	17
Controlling Weeds in Small Grain	2	0.7	18
Fertilizing Corn	2	0.7	18
Fertilizing Cotton	2	0.7	18
Harvesting Cotton	2	0.7	18
Harvesting Soybeans	2	0.7	18
Controlling Nutgrass	1	0.4	23
Controlling Weeds in Grain Sorghum	1	0.4	23
Controlling Weeds in Sugar Cane	1	0.4	23
Controlling Weeds in Ponds	1	0.4	23
Controlling Weeds in Rice	1	0.4	23
Spacing Cotton (skip row)	1	0.4	23
Identifying Weeds	1	0.4	23

* Teachers were asked to list five individual unit references of greatest need. The remainder of the responses are shown in Tables XV-XVII.

Table XV. Need for new individual unit reference materials in livestock enterprises

Areas of Instruction	Teacher Replies Number	Percent	Rank
Feeding Beef Cattle	67	24.3	1
Controlling Cattle Parasites	48	17.4	2
Feeding Hogs	25	9.1	3
Controlling Cattle Diseases	16	5.8	4
Feeding Dairy Cows	13	4.7	5
Controlling Swine Parasites	9	3.3	6
Selecting Beef Show Cattle	7	2.5	7
Marketing Beef Cattle	6	2.2	8
Showing Beef Cattle	6	2.2	8
Selecting Beef Breeding Cattle	4	1.4	10
Controlling Dairy Cattle Diseases	4	1.4	10
Controlling Swine Diseases	4	1.4	10
Castrating Beef Cattle	3	1.1	13
Castrating Hogs	3	1.1	13
Breeding Beef Cattle	2	0.7	15
Selecting a Swine Feeding System	1	0.4	16
Branding Cattle	1	0.4	16
Increasing Calving Percentage	1	0.4	16
Marketing Sheep	1	0.4	16
Pregnancy Testing Cattle	1	0.4	16

Table XVI. Need for new individual unit reference materials in agricultural mechanics

Areas of Instruction	Teacher Replies Number	Percent	Rank
Servicing a Tractor Air Cleaner	21	7.6	1
Servicing a Tractor Electrical System	10	3.6	2
Painting Tractors and Equipment	9	3.3	3
Servicing a Tractor Fuel System	7	2.5	4
Painting Farm Buildings	6	2.2	5
Laying Concrete Blocks	5	1.8	6
Operating Farm Tractors	4	1.4	7
Trouble-Shooting Small Gas Engines	4	1.4	7
Operating a Paint Spray Gun	3	1.1	9
Building a Farm Trailer	2	0.7	10
Fundamentals of an Internal Combustion Engine	2	0.7	10
Farm Safety	2	0.7	10
Shop Safety	2	0.7	10
Fitting Tools	2	0.7	10
Reading Blueprints	2	0.7	10
Cutting Common Rafters	2	0.7	10
Servicing Tractor Cooling System	1	0.4	17
Laying Bricks	1	0.4	17
Servicing Tractor Lubricating System	1	0.4	17
Calibrating Power Spray Equipment	1	0.4	17
Laying an Overhead Welding Bead	1	0.4	17
Selecting a Tractor	1	0.4	17
Constructing a Greenhouse	1	0.4	17

Talbe XVII. Need for new individual unit reference materials in miscellaneous areas of instruction

Areas of Instruction	Teacher Replies		Rank
	Number	Percent	
Organization and Functions of Agribusiness	30	10.9	1
Developing a Home Landscape Plan	11	4.0	2
Selective Timber Cutting	10	3.6	3
Producing Commercial Catfish	8	2.9	4
Grafting Pecans	7	2.5	5
Keeping Farm Records	5	1.8	6
Controlling Shrubbery Diseases and Tests	4	1.4	7
Controlling Shrubbery Insects	4	1.4	7
Propagating Ornamental Plants	4	1.4	7
Managing a Greenhouse	3	1.1	10
Land Use	3	1.1	10
Pruning Shrubbery	2	0.7	12
Estimating Timber	2	0.7	12
Securing Farm Financing	2	0.7	12
Controlling Fire Ants	2	0.7	12
Leveling Land	1	0.4	16
Testing Soil	1	0.4	16
Agricultural Outlook	1	0.4	16
Controlling Forest Fires	1	0.4	16

Table XVIII. Need for supplemental teaching aids

Supplemental Teaching Aids	Teacher Replies* Number	Percent	Rank
Illustrated pamphlets, job operation sheets, information sheets, and similar materials	238	86.2	1
Overhead projection transparencies	237	85.9	2
16 mm film	231	83.7	3
Wall charts	224	81.2	4
35 mm filmstrips	219	80.5	5
2 x 2 slides	140	52.5	6
Radio scripts	39	14.9	7
Television scripts	38	14.5	8
Models	2	0.7	9

* Each respondent had five choices.

Table XIX. Teacher attitude concerning policy related to composition of committee for planning and developing reference material outlines

Representatives	Weighted Mean Score*	Rank
Department of Agricultural Education Staffs	4.7	1
Teachers of Vocational Agriculture	4.6	2
State Supervisory Staff	4.4	3
Specialists in Technical Subject Matter Fields	4.2	4
Adult Vocational Agriculture Students	3.0	5
High School Vocational Agriculture Students	2.4	6

* Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree = 2, Strongly Disagree = 1.

Table XX. Teacher attitude concerning miscellaneous policies related to subject matter materials

Policies	Weighted Mean Score*
Reference manuscripts should be reviewed to assure adequate and accurate coverage of information by specialists in technical subject matter fields.	4.5
Assistance (demonstration lessons, etc.) from teacher-training and supervisory staffs is needed to help teachers more effectively interpret and use new subject matter materials.	4.2
Major subject matter materials should be inventoried as local school property to promote their retention in departmental libraries.	2.9

* Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree = 2, Strongly Disagree = 1.

APPENDIX B

ANNOTATED BIBLIOGRAPHY OF THE TEN SELECTED REFERENCES TREATED IN THIS STUDY

Each reference listed in this bibliography contained a series of individual subject matter units for a specific enterprise or broad area of instruction. The publications constitute the materials of this kind, prepared by the Subject Matter Service in the Department of Agricultural Education at Mississippi State University, which were in use in Mississippi departments of vocational agriculture when the data for this study were gathered.

The selected references are listed as they appeared in Parts I, II, and IV in the data-gathering schedule. Shown with each title are the name(s) of the author(s), date of release and/or revision, the number of pages, and the individual subject matter units in the reference.

1. Landscaping Home Grounds. V. E. Graham, O. V. Clark, and A. P. Fatherree; released June 1957. 236 pp.

Contents: Planning the landscape; establishing the landscape; maintaining the landscape planting; establishing and maintaining the lawn; and growing selected plants.

2. Dairy Production. O. V. Clark, L. W. Craig, A. P. Fatherree, and G. G. Powell, Jr.; released June 1958. 319 pp.

Contents: Determining the possibilities of dairying; selecting foundation stock and herd replacements; increasing milk producing capacity of the dairy herd; general principles of feeding dairy cattle; feeding the producing herd; managing the producing herd; feeding and managing young dairy stock; feeding and managing the herd sire; housing; equipment; controlling diseases and parasites of dairy cattle; keeping records; and marketing milk.

3. Hog Production. O. V. Clark, A. P. Fatherree, and O. L. Snowden; released June 1959. 339 pp.

Contents: Determining the possibilities of hog production; selecting the type of hog to grow; selecting breeding stock; care and management of the brood sow and litter; care and management of the boar; feeding hogs for meat production; controlling diseases and parasites of hogs; providing suitable housing and equipment; and marketing hogs.

4. Egg Production. O. V. Clark,and J. F. Scoggin; released June 1960. 357 pp.

Contents: Determining the possibility of egg production in Mississippi; providing housing; providing equipment; selecting and securing stock; brooding chicks and rearing young stock; feeding for egg production; artificial lighting; culling; controlling diseases, parasites, vices, and pests; and marketing.

5. Beef Cattle Production. O. V. Clark, A. P. Fatherree, O. L. Snowden, L. P. Jacks, and Troy V. Majure; released July 1961. 396 pp.

Contents: Determining the possibilities of beef cattle production; determining the type of beef cattle production program to follow; selecting foundation stock and herd replacements; breeding beef cattle; feeding beef cattle; feeding and fitting show cattle; controlling diseases and parasites; providing housing and equipment; miscellaneous management problems; and marketing beef cattle.

6. Basic Principles of Plant Science. L. P. Jacks; released October 1964. 80 pp.

Contents: Classification of agricultural plants; parts of plants--function of each; reproduction systems and reproduction; plant growth--how it takes place; plant nutrition; plant diseases; plant insects--common to farm crops; and weed science.

7. Basic Principles of Soil Science. L. P. Jacks, and J. R. Hamilton; released April 1965. 63 pp.

Contents: The nature and importance of the soil; soil classification and identification; development--formation of soils; components of the soil--function of each; soil productivity--meaning, value, and relation to crop use; soil pH--meaning, relation to plant growth; plant nutrients in the soil; characteristics, including quality of sources of nutrients in commercial fertilizers; principles of soil erosion; and principles of drainage--relation to productivity and value of soils.

8. Basic Principles of Animal Science. L. P. Jacks; released May 1965. 46 pp.

Contents: Anatomy and physiology of farm animals; nutrition of farm animals; environmental factors that affect physiology; diseases of farm animals; and common parasites of farm animals--economics.

9. Judging Livestock and Poultry. O. V. Clark, and A. G. Shepherd, Jr.; released 1955; revised by L. P. Jacks, June 1965. 223 pp.

Contents: Developing skills; livestock showmanship; general livestock; meats, dairy cattle; dairy products; and poultry and poultry products.

10. Corn. Carl E. Beeman; released April 1966. 143 pp.

Contents: General information; selecting a hybrid and obtaining seed; selecting land and preparing the seedbed for corn; planting and spacing; fertilizing; cultivating; irrigating; controlling weeds; controlling diseases; controlling insects; harvesting; drying and storing corn; marketing; and checking corn yields and measuring profits.

APPENDIX C

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